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Medical Accuracy in Sexuality Education: Ideology and the Scientific Process

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Recently, many states have implemented requirements for scientific or medical accuracy in sexuality education and HIV prevention programs. Although seemingly uncontroversial, these requirements respond to the increasing injection of ideology into sexuality education, as represented by abstinence-only programs.

I describe the process by which health professionals and government advisory groups within the United States reach scientific consensus and review the legal requirements and definitions for medical accuracy. Key elements of this scientific process include the weight of scientific evidence, the importance of scientific theory, peer review, and recognition by mainstream scientific and health organizations. I propose a concise definition of medical accuracy that may be useful to policymakers, health educators, and other health practitioners. (*Am J Public Health.* 2008;98:1786–1792. doi:10.2105/AJPH.2007.119602)

If medicine is to fulfill her great task, then she must enter the political and social life.

—Rudolf Virchow, founder of modern pathology

SCIENCE, THE FOUNDATION

for medicine and public health, is increasingly being manipulated or ignored in the debates surrounding public policy. In areas as diverse as stem cell research, new vaccines for the human papillomavirus, and Food and Drug Administration (FDA) approval of emergency contraception, politics have intruded into scientific policymaking that is normally based on scientific considerations. This interference has also reached into public schools regarding the teaching of evolution and abstinence education.[1–4] Tampering with scientific decisionmaking has included the suppression of data collection and analysis, the muzzling of federal scientists, the packing of scientific advisory committees with members based on political or ideological considerations, the equating of fringe science with mainstream science, and the manipulation of scientific uncertainty.[1,2,5] Although political interference in public health is not new, many have suggested that the George W. Bush administration has politicized science to an unprecedented degree.[5–7]

In this essay, I explore the collision of science and ideology in recent federal policy designed to promote abstinence to improve adolescent reproductive health, and the recent introduction of federal and state legal requirements for medical accuracy as a legislative solution to these ideological debates. Clearly, distinctions can be made between medical and scientific accuracy; however, for the sake of simplicity, in this essay I consider medical accuracy to be the application of scientific accuracy to health matters.

Since enacting "welfare reform" in 1996, the federal government has spent more than $1 billion on assistance to states and to community-based and religion-based organizations for abstinence-only educational programs.[8,9] These programs are not allowed to provide information about condoms and contraception other than their failure rates.[10] A variety of critiques, based on scientific and ethical considerations, have been directed toward US government policies that promote abstinence exclusively.[7,11–20] These critiques, from leading health professional and human rights organizations, have addressed multiple issues, including scientific accuracy, withholding of life-saving information about HIV, failure to delay initiation of sexual intercourse, promotion of gender stereotypes, insensitivity and unresponsiveness to sexually active youths and nonheterosexual youths, harm to comprehensive sexuality education and other domestic public health programs, damage to US foreign aid programs, and inconsistency with ethical imperatives of medicine and public health.[7–9,11–17,19–21] The underlying ideological assumptions of abstinence-only programs appear to be based on the moral and religious

beliefs of their authors. These assumptions are often at odds with current scientific consensus.[22]

MEDICAL ACCURACY IN ABSTINENCE-ONLY EDUCATION PROGRAMS

A number of analyses have specifically examined the scientific or medical accuracy of commonly used abstinence programs. In 2004, the minority staff of the Committee on Government Reform of the US House of Representatives reviewed 13 commonly used abstinence-only curricula to see whether they were scientifically accurate.[23] Their report, commonly referred to as the Waxman Report, found that 11 of the 13 curricula contained false, misleading, or distorted information about reproductive health, including inaccurate information about contraceptive effectiveness and the risks of abortion, among others. These curricula treated stereotypes about girls and boys as scientific fact and blurred religious and scientific viewpoints.[23] Two recent reviews of several abstinence-only curricula found similar problems (J.S.S. et al., unpublished data, 2006).[24]

In the fall of 2006, the Government Accountability Office issued 2 reports on federal programs that promote abstinence, both of which faulted the programs' scientific accuracy.[25,26] The first report found that the Agency for Children and Families, which dispenses most of the federal funding for abstinence education through the Community Based Abstinence Education (CBAE) or Title V programs, does not review grantees' educational materials for scientific accuracy and does not require either CBAE or Title V recipient programs to review their own materials for scientific accuracy.[25] The second report concluded that the federal statutory requirement (section 317P(c)[2] of the Public Health Service Act,[27] also known as "the federal condom statute") to include scientifically accurate information on condom effectiveness would apply to abstinence education materials prepared and used by federal grant recipients.[26] The Department of Health and Human Services (DHHS), parent agency of the Agency for Children and Families, responded that section 317P does not apply to abstinence education,[26] although the 2007 program guidelines for the CBAE program created a new requirement specifically pertaining to medical accuracy.[28]

What is meant by medical or scientific accuracy, and how do health professions determine it? In answering these questions, it is useful to examine how medical and public health organizations review scientific studies to formulate policy guidance.

SCIENTIFIC CONSENSUS IN SETTING HEALTH POLICY

The community of scholars within a scientific discipline provides opportunities for vetting and critiquing new ideas through professional meetings and conferences, peer-reviewed publications, advisory boards, university education, and mentoring of junior scientists. This scientific community operates through a variety of professional organizations—of scientists, public health workers, and medical professionals—that promote scientific consensus by offering scientific opinions on key policy and practice issues. These organizations include the American Medical Association (AMA), the American Public Health Association (APHA), the American Academy of Pediatrics (AAP), and other specialty and subspecialty groups. The opinions are created and reviewed by a series of scientific committees to ensure both the scientific accuracy and the clarity of specific recommendations.

Likewise, federal government advisory committees such as the Advisory Committee on Immunization Practices, the US Preventive Services Task Force, the Task Force on Community Preventive Services, and the Institute of Medicine, as well as federal agencies such as the Centers for Disease Control and Prevention (CDC), the National Institutes of Health (NIH), and the FDA, offer scientific opinions on a broad variety of health matters. Taking a hard-nose approach, these bodies separate scientific fact from fallacy to ensure that policy is based on current scientific understanding.

These consensus statements are authoritative recommendations informed by scientific research. Membership within these advisory groups is based on scientific accomplishment and recognition by professional peers. Such groups use a variety of methods to reach consensus on scientific matters, including literature reviews, formal meta-analyses, and clinical experience. All scientific disciplines have standards for scholarship that are used to judge the quality of specific studies, although such standards differ among professions and disciplines. The methods for reviewing scientific findings, rating the strength of scientific evidence, and reaching recommendations are often explicitly defined in written documents.[29,30] These review processes favor research published in peer-reviewed journals, particularly in journals held in high regard within the medical and scientific communities.

Scientific panels weigh both the predominance of evidence and the consistency of specific studies with scientific theory within a particular discipline. These reviews examine key issues of scientific validity, such as the strength of research design, sample size, the generalizability of findings, and other issues related to scientific rigor. Policymakers and practitioners alike use these consensus statements in their decisionmaking. Although this scientific consensus process does not guarantee consensus in policymaking, particularly where strong cultural beliefs or economic forces are at work, it is often essential in determining scientific accuracy.

The licensure of the first vaccine to prevent human papillomavirus infection and cervical cancer is an example of how this scientific consensus process can work when confronted with social and cultural concerns.[31] On the basis of research findings provided by the drug company (Merck), FDA advisory committees recommended licensure, and the FDA subsequently approved the vaccine for

sale in 2006. Following licensure, the Advisory Committee on Immunization Practices endorsed the vaccine's use among females aged 9 to 26 years and provided specific recommendations for its use. Medical associations such as the Society for Adolescent Medicine and the American College of Obstetricians and Gynecologists (ACOG) have endorsed its widespread use.

Despite concerns among social conservatives that the vaccine would lead to increased sexual risk taking among teens and despite conservative political leadership in the White House, the scientific review and consensus process functioned properly and led to approval of a vaccine that appears to be very safe and potentially highly efficacious.[32] More than 20 states are currently considering legislation to mandate vaccine coverage. Despite considerable evidence that state mandates requiring vaccination before school entry improve vaccine coverage for children and adolescents,[30] opposition has been strong, with conservatives being joined by those who oppose childhood vaccinations in general, those worried about drug company tactics, and physicians who are concerned about costs, long-term efficacy, and side effects.[31,33]

Similar review and consensus processes have been used in determining the efficacy of sexuality education, including abstinence-only education.[17,19,20] Most recently, scientific review has been extended to the content of sexuality education curricula (J.S.S. et al., unpublished data, 2006).[23,24,34]

STATE AND FEDERAL REQUIREMENTS FOR MEDICAL ACCURACY

State governments and the federal government have begun requiring medical accuracy in public health programs such as sexuality education, HIV prevention programs, and condom distribution (A. Barbour, JD, written communication, 2006). For example, section 317P(c)[26] of the Public Health Service Act requires medical accuracy when educational materials about sexually transmitted diseases (STDs) are created and distributed by the DHHS and its grantees. Such materials must contain "medically accurate information regarding the effectiveness or lack of effectiveness of condoms in preventing the STD." Notably, the federal statute does not define "medical accuracy."

On the basis of a WestLaw search of all 50 state statutes, 21 states (Arizona, California, Colorado, Iowa, Illinois, Indiana, Louisiana, Maine, Maryland, Michigan, Minnesota, Missouri, Nevada, New York, North Carolina, Oklahoma, Oregon, Rhode Island, Texas, Utah, and Washington) have in some way required medical or scientific accuracy (using a variety of terms) in the provision of sexuality or HIV/AIDS education, although often without defining the term (A. Barbour, written communications, 2006). Seven states have definitions of medical accuracy in some area of health law; 5 of these are related to state sexuality or HIV educational requirements, and 2 are related to clinical counseling—for example, information provided to sexual assault victims (Table 1). Some states, such as New Mexico, have undertaken specific reviews of abstinence curricula, whereas other states, such as New Jersey, have rejected the curricula outright and declared they are unable to review each individual curriculum.[35]

California requires that information presented in "sexual health education [courses] shall be medically accurate and objective" (Cal Education Code §51933(b)[2]). Similarly, Utah law requires the state board of education to approve instructional materials used in school health courses (Utah Code §53A-13-101[1](c)(i)), and an additional educational regulation mandates that the board may "approve only medically accurate human sexuality instruction programs" (Utah Administrative Code r 277-474.4.(D)). Colorado requires and defines medical accuracy with respect to HIV and AIDS prevention and education programs (Colo Rev Stat §25-4-1413[5]; 6 Colo Code Regs §1009-1010(1.1)(G)). A new Colorado statute also requires school human sexuality courses to be "medically accurate according to published authorities upon which medical professionals generally rely" (HB 07-1292, 66th Gen Assem, Reg Sess (Colo 2007), amending Colo Rev Stat §22-1-110.5(e)). Finally, new state laws in Iowa and Washington require sexuality education to be "research based" and "medically and scientifically accurate," respectively. New Mexico and New Jersey require (and define) medical accuracy with respect to written and oral information provided to sexual assault survivors (NM Code R §§7.7.2.7(KK), 7.7.2.38(B)[6]; NJ Stat §§26:2 h-12.6b, 26:2 h-12.6c).

The medical accuracy definitions found in the California, Iowa, New Jersey, and Washington statutes and the Utah, New Mexico, and Colorado regulations are nearly identical. In these cases, medical accuracy is defined by 3 interrelated features: (1) verification or support of research conducted under accepted scientific methods, (2) publication in peer-reviewed journals, and (3) recognition as accurate and objective by mainstream professional organizations such as the AAP, ACOG, and APHA and government agencies such as the CDC.

New Mexico, New Jersey, and Iowa add an important qualifier to the definition of medical accuracy: "weight of research," meaning that research be must be supported by the weight of scientific evidence. This concept is intrinsic in the peer review process of professional organizations and government agencies.

The Colorado definition includes 2 additional components: (1) linkage to social, behavioral, and biomedical theories and (2) adaptation of programs that are evidence based. Iowa adds the important notion of "complete" information.

Are these state definitions of medical accuracy adequate? The short answer is yes, particularly if one considers the features identified by New Mexico, New Jersey, Iowa, and Colorado, which add critical dimensions to the definition of medical accuracy. These state definitions clearly recognize

TABLE 1—State Definitions of Medical Accuracy

State	Statute (Year Enacted)	Scope	State Definition of Medical Accuracy
California	Cal Educ Code §51931(f) (2003)	Sexuality education	"Verified or supported by research conducted in compliance with scientific methods and published in peer-reviewed journals, where appropriate, and recognized as accurate and objective by professional organizations and agencies with expertise in the relevant field, such as the federal Centers for Disease Control and Prevention, the American Public Health Association, the American Academy of Pediatrics, and the American College of Obstetricians and Gynecologists."
Utah	Utah Admin Code r 277.474.1(G) (2001)	School health education	"Verified or supported by a body of research conducted in compliance with scientific methods and published in journals that have received peer review, where appropriate, and recognized as accurate and objective by professional organizations and agencies with expertise in the relevant field, such as the American Medical Association."
New Mexico	NM Code R §7.7.2.7(KK) (2004)	Sexual assault survivors, information about emergency contraception	"Verified or supported by the weight of research conducted in compliance with accepted scientific methods and standards; published in peer-reviewed journals; and recognized as accurate and objective by leading professional organizations and agencies with relevant expertise in the field of obstetrics and gynecology, such as the American College of Obstetricians And Gynecologists."
New Jersey	NJ Stat §26:2 h-12.6b (2005)	Sexual assault survivors, information about emergency contraception and STDs	"Verified or supported by the weight of research conducted in compliance with accepted scientific methods and standards, published in peer-reviewed journals, and recognized as accurate and objective by leading professional organizations and agencies with relevant expertise in the field of obstetrics and gynecology."
Colorado	6 Colo Code Regs §1009-1010(1.1)(G) (2006)	HIV/AIDS prevention and education programs	"*Consistent with one or more of the following*: 1. Verified or supported by research conducted in compliance with scientific methods; 2. Recognized as accurate and objective by professional organizations and agencies with expertise in the relevant field, such as the American Public Health Association, American Social Health Association, the American Academy of Pediatrics, the American Academy of Family Physicians, the American College of Obstetricians and Gynecologists, the Infectious Disease Society of America, and the American Psychological Association; 3. A study published in a peer-reviewed journal; 4. Clearly identified link to social, behavioral, and biomedical science theories; or 5. A local adaptation of an evidence-based model."
Iowa	Iowa Code §279.50(9)(d)(1) (2007)	Instruction in human growth and development, human sexuality, STDs, and HIV/AIDS	"Complete information that is verified or supported by the weight of research conducted in compliance with accepted scientific methods; recognized as medically accurate and objective by leading professional organizations and agencies with relevant expertise in the field, such as the American College of Obstetricians and Gynecologists, the American Public Health Association, the American Academy of Pediatrics, and the National Association of School Nurses; and published in peer-reviewed journals where appropriate."
Washington	Wash Rev Code §28A.300.475(2) (2007)	Sexual health education	"Information that is verified or supported by research in compliance with scientific methods, is published in peer-review journals, where appropriate, and is recognized as accurate and objective by professional organizations and agencies with expertise in the field of sexual health including but not limited to the American College of Obstetricians and Gynecologists, the Washington State Department of Health, and the federal Centers for Disease Control and Prevention."

Note. STD = sexually transmitted disease.

the process used by health professionals and scientists themselves, and they reflect the practical realities by which scientific consensus is produced.

The social–political context for requirements for medical accuracy is important. Since the 2004 Waxman Report, conservative organizations that support abstinence-only programs have attempted to define medical accuracy themselves.[36,37] For example, the Medical Institute for Sexual Health, a physicians' group based in Texas that promotes sexual abstinence, and the National Abstinence Leadership Council have issued statements on medical accuracy. Although these statements acknowledge the importance of correctly quoting scientific research, of peer review, and of research being published in a medical journal, they also undermine the scientific consensus process—for example, by suggesting that "not all government agency recommendations meet this standard [of medical accuracy]."[36] Moreover, the definitions of medical accuracy put forward by these conservative organizations are incomplete in key respects; they fail, for example, to acknowledge the positive importance of scientific consensus and the predominance of scientific evidence.

Neither the definitions of conservative organizations nor those of states (with the exception of Colorado) address the use of theory in guiding scientific discovery and producing consensus. Theory is critical to the scientific process and in distinguishing science from ideology.

SCIENTIFIC THEORY

An unfortunate feature of many current public debates is the manipulation of scientific uncertainty and confusion about scientific theory.[6] Discovery and debate within the scientific community are critical to the scientific process, and scientists are generally acutely aware of the limits to their own understanding. Does this suggest that scientific theories are merely unproven hypothetical constructs? If science is not definitive, is any scientific fact as good as any other? This confusion (or perhaps obfuscation) goes to the heart of the processes by which science reviews and reaches consensus on health issues.

Scientific discovery builds theories or paradigms—that is, all-encompassing theoretical constructs that attempt to explain a body of scientific findings.[38] In its classic formulation by Kuhn, a paradigm is expected to be consistent with all of the scientific findings within a specific area of scientific investigation and not inconsistent with other theories.[38] Theoretical paradigms are not static, but substantial alternative findings are required to incite a paradigm shift or scientific revolution. An example is Darwin's discovery of natural selection, which became the foundation for a new theory of evolution and is essential to modern biology and medicine. Some groups that oppose the idea of natural selection have developed an alternate "theory"—so-called intelligent design—that is not science at all; this "theory" fails to follow the rules of science discovery and collapses under the accumulated body of scientific evidence. It makes little attempt to be encompassing and is rejected by mainstream organizations of biologists.

In the behavioral sciences and health education, we are seeing the emergence of consensus theories of behavior change based on several decades of research, particularly AIDS prevention research.[39,40] This emerging paradigm emphasizes key psychosocial factors such as self-efficacy and peer norms and stages of behavior change. These factors have become key building blocks in developing comprehensive, effective sexuality curricula, such as Safer Choices.[41] Likewise, Kirby et al. have identified key characteristics of effective programs.[42] These psychosocial factors and characteristics do not appear to have influenced the creation of abstinence-only curricula.

IMPORTANCE OF COMPLETE INFORMATION

A final issue in debates over medical accuracy involves the withholding of information about the benefits of condoms and contraception in abstinence-only curricula. Federal abstinence programs must have as their "exclusive purpose" the promotion of abstinence outside of marriage and may not in any way advocate contraceptive use or discuss contraceptive methods except to emphasize their failure rates.[10,43] Programs may discuss the risks and failures of contraception but not their benefits or successes in preventing pregnancy or HIV and other STDs. This specific program restriction clearly requires programs to provide biased information, by withholding positive information about contraception. It is therefore not surprising that the Waxman Report found that commonly used abstinence programs contained inaccurate information about the effectiveness of condoms and other contraceptives.[23]

Withholding potentially lifesaving information from sexually active adolescents is ethically troubling.[15–17] The principle of informed consent suggests that persons should be given all the information they need to make informed choices.[44] Patients expect to receive complete and accurate information about treatment options from their physicians. Likewise, adolescents at risk of HIV, other STDs, and unintended pregnancy need information on ways to prevent these. The AMA and other medical societies have endorsed annual behavioral screening and counseling for adolescents about sexual health.[45] Similarly, key medical and public health groups have endorsed comprehensive sexuality education.[11,12,17,20] If adolescents are sexually active, they need information to protect their health and lives. In school-based health education programs in which a significant proportion of students are sexually active or will be shortly, students need access to education that provides accurate information about condoms and contraception. Therefore, where there is a need to know, medically incomplete is medically inaccurate.

CONCLUSIONS AND IMPLICATIONS

Koplan and McPheeters have suggested that science should inform public health, which in turn should drive public policy.[46] Unfortunately, they find that often the reverse is true, with politics driving public health decisionmaking and then seeking scientific justification by using faulty science. Such manipulations of public policymaking must be stopped.

In this context, the requirement for medical accuracy is a welcome and generally helpful development for sexuality education and is potentially useful in other areas of health. Requiring medical accuracy can help clarify debates between mainstream scientists and ideologically driven groups who claim the mantle of science in supporting specific social policies. Understanding the scientific consensus process can prevent the manipulation of scientific uncertainty. Health professionals and scientists need to become active in speaking out on the importance of scientific integrity in public policy. This can be done personally through letters and community advocacy or more broadly by energizing professional organizations around these issues.

Likewise, a definition of medical accuracy, based on current practices for developing scientific consensus, would be helpful to state and federal policymakers and local practitioners. Such a definition should incorporate a comprehensive understanding of the scientific process. I suggest the following definition of medically accurate information:

> Information relevant to informed decisionmaking based on the weight of scientific evidence, consistent with generally recognized scientific theory, conducted under accepted scientific methods, published in peer-reviewed journals, and recognized as accurate, objective, and complete by mainstream professional organizations such as AMA, ACOG, APHA, and AAP; government agencies such as CDC, FDA, and NIH; and scientific advisory groups such as the Institute of Medicine and the Advisory Committee on Immunization Practices. The deliberate withholding of information that is needed to protect life and health (and therefore relevant to informed decisionmaking) should be considered medically inaccurate.

All states and the federal government should adopt requirements for medical accuracy in health education. At a national level, the DHHS should create an independent review process to ensure the accuracy of commonly used health education curricula that are supported by the federal government. Likewise, states should convene advisory bodies of knowledgeable medical professionals and public health officials to review local curricula.

Requirements for medical accuracy will not end attempts to manipulate health policymaking. However, they provide a clear standard in refuting such attempts. Even in the absence of a specific public health mandate or definition, appeals for medical accuracy may be a useful approach in promoting scientifically grounded health policies. ■

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